of Ann Arbor, Michigan, U.S.A., announces that he has made a remarkable zoological discovery in the Philippine Islands. In the interior of the little-known Island of Mindoro he has procured specimens of a strange animal, which, although much talked of in the Philippines, is little, if at all, known elsewhere. This is the *Tamaron* of the natives, a wild species of the family Bovidæ, allied to the Anoa of Celebes, which Prof. Steere proposes to call *Anoa mindorensis*. Its general colour is black, the hairs being short and rather fine. A greyish white stripe runs from near the inner corner of the eye towards the base of the horn. There is also a greyish white spot above the hoof on all the feet, and a greyish white patch on the inside of the lower fore-leg. The height of the male at the shoulder is about 3 feet 6 inches, the length from the nose to the base of the tail about 6 feet 8 inches. The horns are about 14 inches long. Prof. Steere obtained two males and one female of this animal, of which his full description will be read at the first meeting of the next session of the Zoological Society. The discovery is of much interest, as giving an additional instance of the similarity between the faunas of Celebes and the Philippines, which was already evident from other well-known cases of parallelism between the natural products of these two countries.

P. L. SCLATER.

Functionless Organs.

IN reference to the Duke of Argyll's letter, I should wish to say that I am not aware of any reason for regarding the electric organ of any Skate as a "prophetic structure," using that term in the sense given to it by the Duke. And I should be very glad if he, instead of confining himself to a simple assertion that it is so, would explain the reasons which lead him to regard it as being so. It might then be possible to combat those reasons.

Further, I think it is only right to say that my own observation of the progress of the doctrine of evolution during the last quarter of a century leads me to a conclusion diametrically opposed to the Duke's in regard to the balance of evidence in favour of, or opposed to, the doctrine of creative design in variations on the one hand, and that of the non-significance of variations on the other hand.

I do not hesitate to say that what may be called "pure" Darwinism—the doctrine of the origin of species by the natural selection in the struggle for existence of non-significant congenital variations—is everywhere being more completely demonstrated by reasoning and observation as the single and sufficient theory of that origin; to the exclusion of Lamarckism, and still more certainly to the exclusion of any vestige of the doctrine of design.

E. RAY LANKESTER.

45 Grove End Road, N.W., August 4.

WITH a certain class of thinkers, when endeavouring to disparage the labours of Charles Darwin, no argument appears absurd. Does the Duke of Argyll, in his letter which appeared in your last issue (p. 341), mean to imply by his "prophetic germs" that such cases as the mammæ in the male indicate a time when he will be able to take part with the female in suckling the young, and that the coccyx is prophetic of a tail to the human family, or that a time is approaching when the rudimentary covering of hair on the human body will develop into a warm coat similar to that of the bear or the beaver? For myself, I fail to see how a "functionless organ" can build *itself* up. Perhaps the Duke of Argyll will explain.

J. T. HURST.

Raymond Villa, Geraldine Road, Wandsworth, S.W.,
August 11.

Dr. Romanes's Article in the "Contemporary Review."

ABSENCE from England has hitherto prevented me from seeing Mr. Poulton's letter in your issue of July 26 (p. 295). Having just read it, I am not a little surprised that he should have deemed it necessary to refer me to the titles of two of the most notorious essays in the recent literature of Darwinism. Nor can I fail to wonder that, without a particle of evidence, he should accuse any man of "not making himself acquainted with views which he professes to express."

If I could think it worth while to discuss a somewhat lengthy matter with a critic of this kind, it would be easy enough to justify the incidental remark in my paper to which he has drawn attention. But my only object in noticing his criticism is to observe that, if its tone is due to his supposing that I have not sufficiently appreciated the importance of his own experiments in this connection, he is entirely mistaken. For, although I do not agree with his theoretical interpretation of them, it has always appeared to me that the experiments themselves are among the most valuable which have hitherto been made regarding the causes of variation. But it has also appeared to me that my appreciation of their importance in this respect depends upon what he calls "the Lamarckian conception," *i.e.* a conception which he expressly repudiates. Were it not for the attitude of theory which he thus adopts, of course I should not have alluded to him as a naturalist who concerns himself less with the causes of variation than the other (or Lamarckian) writers whom I had occasion to name. But, as the matter stands, I have merely forestalled the expression of his opinion as stated by himself, where he says in his letter to you, "I agree with Dr. Romanes in the belief that my work does not throw any light upon the causes of variation."

My paper was concerned only with the opinions of others, and I nowhere expressed the "belief" thus attributed to me. In point of fact, "the Lamarckian conception" enables me to hope that work of the kind on which Mr. Poulton is engaged is more calculated than any other to throw light upon the problem in question; and it seems to me a curious corroboration of the remark to which he objects that, on account of his loyalty to the school of Weismann, he is obliged to regard his own experiments as destitute of significance in this respect.

August 9. GEORGE J. ROMANES.

Taxation in China.

NATURE (vol. xxxvii. p. 269), in its review of M. Sîmon's "China: its Social, Political, and Religious Life," represents on that author's authority that in China "taxation is very light—not one-hundredth part of what it is in France," a statement so misleading to publicists, so illusive to economic science, that I take upon myself the task of exposing its fallacy, both as regards direct and indirect taxation.

Taking for illustration the amount of taxation at Ningpo (M. Sîmon was the efficient Consul of his country at that port, where he won golden opinions of foreigners generally, and natives as well), it will be seen that he has been led into egregious errors by incompetent interpreters.

M. Sîmon says that "five francs per *hectare* is the utmost that is paid for the best land."

From municipal archives I tabulate the following relative to the three qualities of rice land:—

Quality of Land.	Relative Quantity.	Taxation per Mou.	Taxation per hectare.	Taxation per acre.
1st	60% ...	$0.35 ...	$5.25 ...	$2.10
2nd	25 ...	0.28 ...	4.20 ...	1.68
3rd	15 ...	0.25 ...	3.75 ...	1.50
Average ...	100	0.29⅓	4.40	1.76

Six mou = one acre. Fifteen mou = one hectare.

Hill land, $0.13 per mou. From the second quality only one crop is obtained.

Instead, therefore, of the *best land* being five francs per *hectare*, it is (according to present rate of exchange) about 21 francs, and for the average about 17 francs per *hectare*.

With regard to indirect taxation, that author affirms that the Chinaman has no excise duties to pay. So far from that being the case, his octrois (*likin*) contribute far more to the State demands than the levies on his land; but from lack of trustworthy data, that is altogether an incomputable quantity.

Nevertheless, with such levies, and the salt gabel and so forth, it may be shown that the Chinese are not overburdened with taxation; albeit to imagine that their taxation is "not one-hundredth part of what it is in France" is sheer economic hallucination.

D. J. MACGOWAN.

Wenchan, June.

Partial Eclipse of August 7.

THE above eclipse was observed at Cambridge, and the times of contact were estimated as follows:—

	h.	m.	s.	
First contact ...	6	44	50	G.M.T.
Last contact ...	7	7	20	,,

At the time of greatest eclipse, 6h. 56m., a photograph was taken which on being measured gives a magnitude of about

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0·021, but this is only a rough approximation. The co-ordinates of the Observatory are—

28·6s. E.
52° 12′ 10″ N.

A. C. CROMMELIN.

Trinity College, Cambridge, August 10.

Macclesfield Observations.

MANY years ago, in studying Rigaud's "Bradley," I was impressed by several references to extensive series of observations with transit and quadrant made at the observatory of Shirbourn Castle, some of which Bradley evidently thought worthy of comparison with his own inaccuracy. It has often occurred to me that these observations, if the records still exist, may well be worthy of as thorough a reduction as has been given to those of other early astronomers. Perhaps some of your readers can tell us something about these records of 1739-89.

CLEVELAND ABBE.

Washington, July 30.

A Lunar Rainbow.

WET Mountain Valley in Colorado is situated some 8000 feet above the sea, and is surrounded by mountains, the Sangre de Cristo Range, on the western side, rising to some 14,000 feet in its highest peaks. For the last few days we have had a succession of thunderstorms—dark clouds pouring forth abundant rain—which have mostly swept along the range, leaving the valley clear, and often in sunshine. Last night, at 9 p.m., there passed just such a storm, while the full moon shone brightly from the east, where it had just risen. The result was a lunar rainbow—part only of the arc, a distinct band of light, in which the several colours were hardly to be observed. The phenomenon, which was new to me and must surely be rare, lasted only about a quarter of an hour, when the storm passed on.

West Cliff, Colorado, July 25. T. D. A. COCKERELL.

GLOBULAR STAR CLUSTERS.

PHYSICAL aggregations of stars may be broadly divided into "globular" and "irregular" clusters. Although, as might have been expected, the line of demarcation between the two classes is by no means sharply drawn, each has its own marked peculiarities. We shall limit our attention, in the present article, to the first kind.

The particles of a drop of water are not in more obvious mutual dependence than the components of these objects—"the most magnificent," in the elder Herschel's opinion, "that can be seen in the heavens." Were there only one such collection in the universe, the probability of its separate organization might be reckoned "infinitely infinite"; and no less than one hundred and eleven globular clusters were enumerated by Sir John Herschel in 1864. It does not, however, follow that the systems thus constituted are of a permanent or stable character; the configuration of most of them, in fact, points to an opposite conclusion.

There may, of course, be an indefinite number of arrangements by which the dynamical equilibrium of a "ball of stars" could be secured; there is only one which the present resources of analysis enable us distinctly to conceive. This was adverted to, many years since, by Sir John Herschel. Equal revolving masses, uniformly distributed throughout a spherical space, would, he showed, be acted upon by a force varying *directly* as the distance from the centre. The ellipses described under its influence would then all have an identical period: whatever their eccentricities, in whatever planes they lay, in whatever direction they were traversed, each would remain invariable; and the harmony of a system, in which no perturbations could possibly arise, should remain unbroken for ever: provided only that the size of the circulating bodies, and the range of their immediate and intense attractions, were insignificant compared with the spatial intervals separating them ("Outlines of Astronomy," 9th ed., p. 636).

But this state of nice adjustment is a mere theoretical possibility. There is no sign that it has an actual existence in Nature. The stipulations, upon compliance with which its realization strictly depends, are certainly disregarded in all stellar groups with which we have any close acquaintance. The components of these are neither equal, nor equally distributed. Central compression, more marked than that due simply to the growth in depth inward of the star strata penetrated by the line of sight, is the rule in globular clusters. The beautiful white and rose-tinted one in Toucan shows three distinct stages of condensation; real crowding intensifies the "blaze" in the middle of the superb group between η and ζ Herculis; in other cases, the presence of what might be called a nuclear mass of stars is apparent. Here, then, the "law of inverse squares" must enter into competition with the "direct" law of attraction, producing results of extraordinary intricacy, and giving rise to problems in celestial mechanics with which no calculus yet invented can pretend to grapple.

Sir John Herschel allowed the extreme difficulty of even imagining the "conditions of conservation of such a system as that of ω Centauri or 47 Toucani, &c., without admitting repulsive forces on the one hand, or an interposed medium on the other, to keep the stars asunder" ("Cape Observations," p. 139). The establishment, however, in such aggregations of a "statical equilibrium," by means of this "interposed medium," is assuredly chimerical. The hypothesis of their rotation *en bloc* is countenanced by no circumstance connected with them. It is decisively negatived by their irregularities of figure. These objects are far from possessing the sharp contours of bodies whirling round an axis. Their streaming edges betray a totally different mode of organization.

Globular clusters commonly present a radiated appearance in their exterior parts. They seem to throw abroad feelers into space. Medusa-like, they are covered with tentacular appendages. The great cluster in Hercules is not singular in the display of "hairy-looking, curvilinear" branches. That in Canes Venatici (M 3) has "rays running out on every side" from a central blaze, in which "several small dark holes" were disclosed by Lord Rosse's powerful reflectors (Trans. Roy. Dublin Society, vol. ii. p. 132, 1880); showing pretty plainly that the spiral tendency, visible in the outer regions, penetrates in reality to the very heart of the system. From a well-known cluster in Aquarius (M 2), "streams of stars branch out, taking the direction of tangents" (Lord Rosse, *loc. cit.* p. 162). That in Ophiuchus (M 12) has stragglers in long lines and branches, noticed by the late Lord Rosse to possess a "slightly spiral arrangement." Herschel and Baily described a remarkable group in Coma Berenices (M 53) as "a fine compressed cluster with curved appendages like the short claws of a crab running out from the main body" (Phil. Trans., vol. cxxiii. p. 458).

We find it difficult to conceive the existence of "streams of stars" that are not *flowing;* and accordingly the persistent radial alignment of the components of clusters inevitably suggests the advance of change, whether in the direction of concentration or of diffusion. Either the tide of movement is setting inward, and the "clustering power" (to use Sir William Herschel's phrase) is still exerting itself to collect stars from surrounding space; or else a centrifugal impulse predominates, by which full-grown orbs are driven from the nursery of suns in which they were reared, to seek their separate fortunes, and lead an independent existence elsewhere. It would be a childish waste of time to attempt at present to arrive at any definite conclusion on so recondite a point; but if the appeal to "final causes" be in any degree admissible, it may be pointed out that mere blank destruction and the

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